IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Barsness, *et al.*	Docket No.:	ROC920030327US1
Serial No.:	10/733,752	Group Art Unit:	2163
Filed:	12/11/03	Examiner:	Le, Michael

TITLE: DATABASE RANGE CONSTRAINT THAT IS DYNAMICALLY
           LIMITED BY DATA IN THE DATABASE

REPLY BRIEF

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Commissioner for Patents
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Sir:

This Reply Brief is filed to address the examiner's comments in the Examiner's
Answer dated 01/09/2008.

ARGUMENT

Issue 1:   **Whether claims 1-6, 8-9, 11-13, 15-24, 29, 32-36, 38, 41, 43 and 46 are**
                 unpatentable under 35 U.S.C. §103(a) as being obvious in view of
                 Bakuya and Zuzarte.

Claims 1-2, 8, 16-17, 29, 32 and 38

Appellant stands on the arguments made with respect to claims 1-2, 8, 16-17, 29,
32 and 38 in the Appeal Brief, which are incorporated herein by reference. In addition,
appellant submits the following arguments related to the examiner's statements in the
Examiner's Answer.

In the Examiner's Answer the examiner states:

> Appellant argues that the statistical constraints of Zuzarte cannot be used as integrity constraints, however, whether the statistical constraints of Zuzarte can be used as integrity constraints is irrelevant. The statistical analysis disclosed by Zuzarte can be utilized to determine constraints, especially since the statistical analysis considers the high and low values of data in a column of a table in a database.

The examiner's assertion "whether the statistical constraints of Zuzarte can be used as integrity constraints is irrelevant" is in error. This goes to the heart of the combination of Bakuya and Zuzarte. The reason appellant stated the statistical constraints of Zuzarte cannot be used as integrity constraints is to illustrate that one of ordinary skill in the art would not be motivated to combine Bakuya and Zuzarte as suggested by the examiner because the characteristics of the soft statistical constraints in Zuzarte are contrary to the characteristics of the integrity constraints in Bakuya. Thus, contrary to the examiner's assertion that this statement is irrelevant, the fact the statistical constraints of Zuzarte expressly teach away from their use as integrity constraints is not only relevant, but fatal to the examiner's rejection. Zuzarte does teach statistical constraints, but the statistical constraints as taught by Zuzarte are for the express purpose of estimating cardinality, which may then be used to optimize a query. The statistical constraints in Zuzarte are not used to limit the data that may be entered into a database column. Thus, the constraints in Zuzarte are not integrity constraints. Optimizing a query and entering data into a database are two completely different functions. Zuzarte teaches query optimization while the claims herein claim limitations for entering data into a database. Entering data into a database is completely independent of the optimization of queries to that database.

The examiner apparently believes the statistical soft constraints in Zuzarte can be combined with the integrity constraint in Bakuya. Perhaps this is because they are both called "constraints." However, the similarity of the word label used cannot support the examiner's combination when the express teachings of the references show entirely different uses for these constraints. The statistical soft constraints in Zuzarte are used to

estimate cardinality for optimizing queries. The integrity constraints in Bakuya are used to limit entry of data into a database column. Optimizing queries (as taught in Zuzarte) has nothing to do with inserting data into a database column (as taught in Bakuya). Because query optimization is not done as data is inserted into a database column, one of ordinary skill in the art at the time the invention was made would not be motivated to combine the teachings of Bakuya and Zuzarte as suggested by the examiner.

In response to Appellant's assertion that the motivation to combine Bakuya with Zuzarte is defective, the examiner states in the Examiner's Answer at p. 13:

> Zuzarte describes the difficulty in performing complex queries and estimating cardinalities without having some knowledge about the relationship between columns. Zuzarte continues by describing a statistical analysis of the columns would be advantageous in aiding the cardinality estimate, which in turn would be used for optimizing queries to the database table. See Also Zuzarte at para. 0006. As discussed above, Zuzarte goes on to disclose statistical constraints from a statistical analysis of columns in a table, in order to more easily estimate cardinality, which is used for optimizing queries.

It is interesting that the examiner mentioned only one reference when providing an argument against the defectiveness of the motivation to combine. Merely stating the attributes of Zuzarte does not explain why it would be obvious to combine Zuzarte **and** Bakuya. As such, the examiner has failed to provide "motivation to combine" as stated in step (3) in the examiner's own words on page 11 of the Examiner's Answer.

In response to Appellant's assertion that the examiner shifted rationale for the motivation to combine, the examiner states in the Examiner's Answer at p. 13:

> On the contrary, the Examiner attempted to explain the rationale behind the motivation. In the advisory action, the Examiner states that "[p]aragraph 0003 of Zuzarte cited for the motivation to combine discusses the advantages of determining statistics of values of a column as it would aid in estimating cardinality, thereby aiding in optimization of queries". Thus, the motivation to combine Bakuya with Zuzarte did not change, contrary to Appellants allegation.

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The examiner merely states that the rationale behind the motivation to combine did not change without addressing the many arguments why this motivation is ineffective and deficient as stated on pages 11 and 12 in the Appeal Brief.

In response to Appellant's assertion in the Appeal Brief that there is no motivation to combine Bakuya with Zuzarte, the examiner states in the Examiner's Answer at p. 14:

> In this case, as discussed above in section A.1, both Bakuya and Zuzarte disclose database constraints. Therefore, one of ordinary skill in the art would be motivated to at least try to combine Bakuya with Zuzarte to create a database with range constraints that also makes optimizing queries easier. In addition, paragraph 0003 of Zuzarte describes the advantages of determining statistical information, in that it aids in estimating cardinality, which is used for optimizing queries. Thus, there is a motivation to combine found in Zuzarte and in knowledge commonly available to one of ordinary skill in the art.

It is obvious from the examiner's own language that the teachings of Bakuya and Zuzarte are different. The examiner's statement "one of ordinary skill in the art would be motivated to at least try to combine Bakuya with Zuzarte to create a database with range constraints that also makes optimizing queries easier" clearly shows the disjoint nature of the teachings of Bakuya and Zuzarte. No matter how well Zuzarte optimizes queries and Bakuya limits data that can be inserted into a database, the teachings of Bakuya and Zuzarte are disjoint and have no relation to each other. The fact that both teach something called a "constraint" is irrelevant in light of the differences in how these constraints are used. Zuzarte uses the soft statistical constraints to compute cardinality, which may be used during query optimization, not during the insertion of data into a database column. Bakuya uses integrity constraints to limit data that is inserted into a database column, and has nothing to do with query optimization. While both disclose something called a "constraint", the differences in how these constraints are used would preclude one of ordinary skill in the art from combining their teachings, especially when one is used during query optimization and the other is used during insertion of data into

the database. Query optimization does not occur during insertion of data into a database. Thus, the examiner's statement that both disclose "database constraints" is irrelevant to the proper analysis, because the constraints in these two references are so different as to preclude their combination as suggested by the examiner absent the use of impermissible hindsight reconstruction.

Appellant finds it interesting the examiner did not address the arguments at pages 8 and 9 of the Appeal Brief that show the soft statistical constraints in Zuzarte are not necessarily valid for all the data. This fact alone is fatal to the examiner's combination of Bakuya and Zuzarte, and therefore to the rejection of all the pending claims. Because the soft statistical constraints disclosed in Zuzarte are not necessarily valid for all the data, one of ordinary skill in the art at the time the invention was made would not have been motivated to provide an integrity constraint as taught in Bakuya with at least one limit that is dynamically determined from data in the database in Zuzarte, as suggested by the examiner in the rejection of claim 1.

Because none of the cited art nor their combination teach or suggest all of these limitations with their express relationships, claims 1-2, 8, 16-17, 29, 32 and 38 are allowable over the cited art. In addition, each of claims 2, 17 and 32 depend on an independent claim that is allowable for the reasons given above. As a result, claims 2, 17 and 32 are allowable as depending on allowable independent claims. Appellant respectfully requests the examiner's rejection of claims 1-2, 8, 16-17, 29, 32 and 38 under 35 U.S.C. §103(a) be reversed.

Claims 3, 18 and 33

Appellant stands on the arguments made with respect to claims 3, 18, and 33 in the Appeal Brief, which are incorporated herein by reference. In addition, appellant submits the following arguments related to the examiner's statements in the Examiner's Answer. The examiner states that statistical constraints can be used as integrity

constraints, which is in error for the reasons given above. For this reason alone claims 3, 18, and 33 are allowable over Bakuya and Zuzarte under 35 U.S.C. §103(a). In addition, claim 18 depends on claim 17, which is allowable for the reasons given above. Claim 33 depends on claim 32, which depends on claim 29, which is allowable for the reasons given above. As a result, claims 18 and 33 are also allowable as depending on allowable independent claims. Appellant respectfully requests the examiner's rejection of claims 3, 18 and 33 under 35 U.S.C. §103(a) be reversed.

Claims 4, 12, 19, 34 and 43

Appellant stands on the arguments made with respect to claims 4, 12, 19, 34, and 43 in the Appeal Brief, which are incorporated herein by reference. In addition, appellant submits the following arguments related to the examiner's statements in the Examiner's Answer. The examiner states that statistical constraints can be used as integrity constraints, which is in error for the reasons given above. For this reason alone claims 4, 12, 19, 34, and 43 are allowable over Bakuya and Zuzarte under 35 U.S.C. §103(a). In addition, claims 4, 12, 19, 34, and 43 each depend on an independent claim, which is allowable for the reasons given above. As a result, claims 4, 12, 19, 34, and 43 are also allowable as depending on allowable independent claims. Appellant respectfully requests the examiner's rejection of claims 4, 12, 19, 34, and 43 under 35 U.S.C. §103(a) be reversed.

Claims 5, 11, 15, 20 and 35

Appellant stands on the arguments made with respect to claims 5, 11, 15, 20, and 35 in the Appeal Brief, which are incorporated herein by reference. In addition, appellant submits the following arguments related to the examiner's statements in the Examiner's Answer. The examiner states that statistical constraints can be used as integrity constraints, which is in error for the reasons given above. For this reason alone claims 5, 11, 15, 20, and 35 are allowable over Bakuya and Zuzarte under 35 U.S.C. §103(a). In

addition, claims 5, 11, 15, 20, and 35 each depend on an independent claim, which is allowable for the reasons given above. As a result, claims 5, 11, 15, 20, and 35 are also allowable as depending on allowable independent claims. Appellant respectfully requests the examiner's rejection of claims 5, 11, 15, 20, and 35 under 35 U.S.C. §103(a) be reversed.

Claims 6, 9, 13, 36 and 41

Appellant stands on the arguments made with respect to claims 6, 9, 13, 36, and 41 in the Appeal Brief, which are incorporated herein by reference. In addition, appellant submits the following arguments related to the examiner's statements in the Examiner's Answer. The examiner provided no new arguments, but incorporated the arguments for claim 1. Thus claims 6, 9, 13, 36, and 41 are allowable for the same reasons as claim 1 given above, and the arguments for claim 1 are incorporated herein by reference. For this reason alone claims 6, 9, 13, 36, and 41 are allowable over Bakuya and Zuzarte under 35 U.S.C. §103(a). In addition, claims 6, 9, 13, 36, and 41 each depend on an independent claim, which is allowable for the reasons given above. As a result, claims 6, 9, 13, 36, and 41 are also allowable as depending on allowable independent claims. Appellant respectfully requests the examiner's rejection of claims 6, 9, 13, 36, and 41 under 35 U.S.C. §103(a) be reversed.

Claim 21-24 and 46

Appellant stands on the arguments made with respect to claims 21-24 and 46 in the Appeal Brief, which are incorporated herein by reference. In addition, appellant submits the following arguments related to the examiner's statements in the Examiner's Answer. The examiner provided no new arguments, but incorporated the arguments for claims 1, 3, 4, 5, and 6. Thus claims 21-24 and 46 are allowable for the same reasons as claims 1, 3, 4, 5, and 6 given above, and the arguments for claims 1, 3, 4, 5, and 6 are incorporated herein by reference. For this reason alone claims 21-24 and 46 are

allowable over Bakuya and Zuzarte under 35 U.S.C. §103(a). In addition, claims 21-24 and 46 each depend on an independent claim, which is allowable for the reasons given above. As a result, claims 21-24 and 46 are also allowable as depending on allowable independent claims. Appellant respectfully requests the examiner's rejection of claims 21-24 and 46 under 35 U.S.C. §103(a) be reversed.

Issue 2: **Whether claims 7, 10, 14, 25-28, 37, 42 and 47 are unpatentable under 35 U.S.C. §103(a) as being unpatentable over Bakuya in view of Zuzarte and further in view Geppert.**

Claims 7, 10, 14, 25-28, 37, 42, and 47

Appellant stands on the arguments made with respect to claims 21-24 and 46 in the Appeal Brief, which are incorporated herein by reference. Appellant respectfully requests the examiner's rejection of claims 7, 10, 14, 25-28, 37, 42, and 47 under 35 U.S.C. §103(a) be reversed.

CONCLUSION

Claims 1-29, 32-38, 41-43 and 46-47 are addressed in this Appeal. For the numerous reasons articulated in this Reply Brief and in the Appeal Brief previously filed, appellant maintains that the rejection of claims 1-29, 32-38, 41-43 and 46-47 under 35 U.S.C. § 103(a) is erroneous.

Appellant respectfully submits that the Appeal Brief and this Reply Brief fully responds to, and successfully contravene, every ground of rejection and respectfully requests that the final rejection be reversed and that all claims in the subject patent application be found allowable.

Respectfully submitted,

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1. An apparatus comprising:

   at least one processor;

   a memory coupled to the at least one processor;

   a database residing in the memory;

   a range constraint defined for the database, the range constraint including at least one limit that is dynamically determined from data in the database; and

   a database manager residing in the memory and executed by the at least one processor, wherein the range constraint defines a range that includes the at least one limit, and wherein the database manager allows entry of data into the database when the data lies within the range.

2. The apparatus of claim 1 wherein the database comprises at least one database table comprising at least one column, and wherein the range constraint is defined for a selected column.

3. The apparatus of claim 2 wherein the at least one limit is dynamically determined from data in the selected column.

4. The apparatus of claim 2 wherein the at least one limit is dynamically determined from data in a column that is different than the selected column.

5. The apparatus of claim 1 wherein the at least one limit is dynamically determined by performing statistical analysis on data in the database.

6. The apparatus of claim 1 wherein the range constraint defines a range that includes the at least one limit, and wherein the database manager allows entry of data into the database when the data lies within the defined range and does not allow entry of data into the database when the data lies outside the defined range.

7. The apparatus of claim 1 wherein the range constraint defines a range that includes the at least one limit, and wherein:

if the data lies within the defined range, the database manager allows entry of the data into the database; and

if the data lies outside of the defined range, the database manager allows entry of the data into the database and provides a warning message.

8. An apparatus comprising:

at least one processor;

a memory coupled to the at least one processor;

a database table residing in the memory, the database table including at least one column;

a range constraint defined for a selected column in the database table, the range constraint defining a range that includes at least one limit that is dynamically determined from data in the selected column; and

a database manager residing in the memory and executed by the at least one processor, the database manager allowing entry of data into the selected column when the data lies within the defined range.

9. The apparatus of claim 8 wherein the database manager allows entry of data into the selected column when the data lies within the defined range and does not allow entry of data into the database when the data lies outside the defined range.

10. The apparatus of claim 8 wherein the database manager allows entry of data into the selected column when the data lies outside the defined range and in response thereto, provides a warning message.

11. The apparatus of claim 8 wherein the at least one limit is dynamically determined by performing statistical analysis on data in the selected column.

12. An apparatus comprising:

at least one processor;

a memory coupled to the at least one processor;

a database table residing in the memory, the database table including at least one column;

a range constraint defined for a selected column in the database table, the range constraint defining a range that includes at least one limit that is dynamically determined from data in a column that is different than the selected column; and

a database manager residing in the memory and executed by the at least one processor, the database manager allowing entry of data into the selected column when the data lies within the defined range.

13. The apparatus of claim 12 wherein the database manager allows entry of data into the selected column when the data lies within the defined range and does not allow entry of data into the selected column when the data lies outside the defined range.

14. The apparatus of claim 12 wherein the database manager allows entry of data into the selected column when the data lies outside the defined range and in response thereto, provides a warning message.

15. The apparatus of claim 12 wherein the at least one limit is dynamically determined by performing statistical analysis on data in the different column.

16. A computer-implemented method for entering data in a database, the method comprising the steps of:

    (A) defining a range constraint for a selected portion of the database;

    (B) defining at least one limit for the range constraint that is dynamically determined from data in the database; and

    (C) allowing entry of data into the selected portion of the database when the data lies within a range defined by the range constraint.

17. The method of claim 16 wherein the database comprises at least one table comprising at least one column, and wherein the selected portion comprises a selected column.

18. The method of claim 17 wherein step (B) defines at least one limit that is dynamically determined from data in the selected column.

19. The method of claim 17 wherein step (B) defines at least one limit that is dynamically determined from data in a column that is different than the selected column.

20. The method of claim 16 wherein step (B) defines at least one limit that is dynamically determined by performing statistical analysis on data in the database.

21. A computer-implemented method for limiting data entry into a selected column in a database table, the method comprising the steps of:

    (A) defining a range constraint for the selected column, the range constraint defining a range that includes at least one limit that is dynamically determined from data in the database table; and

    (B) allowing entry of data into the selected column only when the data to be entered lies within the defined range.

22. The method of claim 21 wherein step (A) defines at least one limit that is dynamically determined from data in the selected column.

23. The method of claim 21 wherein step (A) defines at least one limit that is dynamically determined from data in a column that is different than the selected column.

24. The method of claim 21 wherein step (A) defines at least one limit that is dynamically determined by performing statistical analysis on data in the database table.

25. A computer-implemented method for entering data into a selected column in a database table, the method comprising the steps of:

(A) defining a range constraint for the selected column, the range constraint defining a range that includes at least one limit that is dynamically determined from data in the database table; and

(B) if the data to be entered lies outside of the defined range, allowing entry of data into the selected column, and in response thereto, providing a warning message.

26. The method of claim 25 wherein step (A) defines at least one limit that is dynamically determined from data in the selected column.

27. The method of claim 25 wherein step (A) defines at least one limit that is dynamically determined from data in a column that is different than the selected column.

28. The method of claim 25 wherein step (A) defines at least one limit that is dynamically determined by performing statistical analysis on data in the database table.

29. A computer-readable program product comprising:

(A) a database manager that allows defining a range constraint for a database, the range constraint including at least one limit that is dynamically determined from data in the database, the database manager allowing entry of data into the database when the data lies within a range defined by the range constraint; and

(B) computer-readable recordable media bearing the database manager.

30-31 (Cancelled)

32. The program product of claim 29 wherein the database comprises at least one database table comprising at least one column, and wherein the range constraint is defined for a selected column.

33. The program product of claim 32 wherein the at least one limit is dynamically determined from data in the selected column.

34. The program product of claim 32 wherein the at least one limit is dynamically determined from data in a column that is different than the selected column.

35. The program product of claim 29 wherein the at least one limit is dynamically determined by performing statistical analysis on data in the database.

36. The program product of claim 29 wherein the range constraint defines a range that includes the at least one limit, and wherein the database manager allows entry of data into the database when the data lies within the defined range and does not allow entry of data into the database when the data lies outside the defined range.

37. The program product of claim 29 wherein the range constraint defines a range that includes the at least one limit, and wherein the database manager allows entry of data into the database and provides a warning message when the data lies outside the defined range.

38. A computer-readable program product comprising:

     (A) a database manager that allows defining a range constraint for a selected column in a database table, the range constraint defining a range that includes at least one limit that is dynamically determined from data in the selected column, the database manager allowing entry of data into the selected column when the data lies within the defined range; and

     (B) computer-readable recordable media bearing the database manager.

39-40 (Cancelled)

41. The program product of claim 38 wherein the database manager allows entry of data into the selected column when the data lies within the defined range and does not allow entry of data into the database when the data lies outside the defined range.

42. The program product of claim 38 wherein the database manager allows entry of data into the selected column and provides a warning message when the data lies outside the defined range.

43. A computer-readable program product comprising:

(A) a database manager that allows defining a range constraint for a selected column in a database table, the range constraint defining a range that includes at least one limit that is dynamically determined from data in a column that is different than the selected column, the database manager allowing entry of data into the selected column when the data lies within the defined range; and

(B) computer-readable recordable media bearing the database manager.

44-45 (Cancelled)

46. The program product of claim 43 wherein the database manager allows entry of data into the selected column when the data lies within the defined range and does not allow entry of data into the database when the data lies outside the defined range.

47. The program product of claim 43 wherein the database manager allows entry of data into the selected column and provides a warning message when the data lies outside the defined range.